

E2-12: Reduction of ion exchange capacity of the resin used in the mixed bed deioniser plant

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Reduction of ion exchange capacity of the resin used in the mixed bed deioniser plant (1962 -1988) at the Thermal Power Station, Colombo had been observed. Eventhough temporary relief was obtained by the remedial measures taken for the identified problem, such as organic fouling and premature silica leakage, there was no improvement in the through put capacity of the water treatment plant. The problem was identified as the symptom of weakness in direct mixed bed demineralisation of raw water, which suffered from a number of objections, such as susceptibility to organic fouling, susceptibility to premature silica leakage and reduced through put capacity in the event of deterioration in raw water quality.

Raw water quality data since 1962, showed a considerable rise in the total ionic contents in the raw water including residual chlorine and organic matter.

A modified mixed bed deioniser plant with a pretreatment system which consists of a dual media filter containing charcoal and gravel to absorb residual chlorine and suspended impurities respectively, followed by an organic scavenging filter and cation-anion series filters, is best suited for the situation. The mixed bed deioniser plant in this system functions as final polishing filter only.

The modified plant delivered 342,000 gallons of deionised water of specific quality (i.e. electrical conductivity of deionised water was less than $1 \mu\text{s}$ and the silica content less than 0.05 ppm) between 2 consecutive regenerations. At the end of the span, the silica content and the electrical conductivity rose above the limiting values and the plant was functioning satisfactorily without any symptoms of fouling of resins. The capacity of the old plant was much lower and seasonal fluctuation of deionised water parameters and symptoms of fouling were observed during operations of the plant.

The studies included measurement of electrical conductivity of water, titrimetric determination of hardness and organic matter and determination of the composition of water by absorptiometric methods.